

What is claimed is:

1. A tooling fixture for applying a compressive load across a bond plane of a component having a predetermined coefficient of thermal expansion, as heat is applied to the component and the fixture, the tooling comprising:

A tie arm base, having a coefficient of thermal expansion relatively of the same order of magnitude as the predetermined coefficient of thermal expansion, structured to capture a portion of the component on a first side of the weld line and extend up along at least two opposite sides of the component a given distance short of another end of the component;

A plurality of adjustment arms spaced around the component, each having a coefficient of thermal expansion relatively of the same order of magnitude as the predetermined coefficient of thermal expansion, attached to the tie arm at the given distance and extending toward the other end of the component short of the other end of the component;

A plurality of tensioning arms, having a coefficient of thermal expansion substantially less than the predetermined coefficient of thermal expansion, respectively attached to each of the adjustment arms at

an end of the adjustment arms closest to the other end of the component and extending past the other end of the component, a combination of the respective adjustment arms and tensioning arms extending to a second side of the weld line;

A top plate situated over the top of the component and connected to each of the tensioning arms; and

Fastening means attached to an end portion of the tensioning arms for tightening the top plate down on the other end of the component and imparting a preload sufficient to hold the component in position.

2. The tooling fixture of Claim 1 for applying a compressive load across a weld line of a plurality of components wherein the tie arm base is common to and captures each of the components spaced from one another.

3. The tooling fixture of Claim 2 for applying a compressive load across a weld line of a plurality of components wherein separate top plates and tensioning arms are provided for each component and each top plate is spaced from one another.

4. The tooling fixture of Claim 1 wherein the length of the adjustment arms is adjustable.

5. The tooling fixture of Claim 4 wherein the lengths
5 of the adjustment arms are adjustable by the extent the adjustment arms are individually screwed into the tie arm base.

6. The tooling fixture of Claim 4 whereas the
10 adjustment of the tensioning arm and adjustment arm length allows control of the rate of change and magnitude of the applied bond plane load during a bond cycle.

7. The tooling fixture of Claim 1 including a
15 deformable compression ring inserted between the fastening means and the top plate for limiting the load applied to the work component.

8. The tooling fixture of Claim 7 wherein the
20 deformable compression ring is constructed from a material selected from a group of alloys comprising Haynes 230, Incoloy 825 and INCO 600.

9. The tooling fixture of Claim 1 wherein the component is a gas turbine blade.

10. The tooling fixture of Claim 9 wherein the tie arm
5 base and the adjustment arm are constructed from nickel base MA 754.

11. The tooling fixture of Claim 9 wherein the
tensioning arm is constructed from TZM (a molybdenum
10 based alloy).

12. The tooling fixture of Claim 9 wherein the top plate is constructed out of either nickel base MA 754 or TZM.

15 13. The tooling fixture of Claim 1 wherein the adjustment arm and the tensioning arm have external threads.

14. The tooling fixture of Claim 1 wherein the fastening
20 means is a load nut that is screwed down on an exposed end of the tensioning arm.